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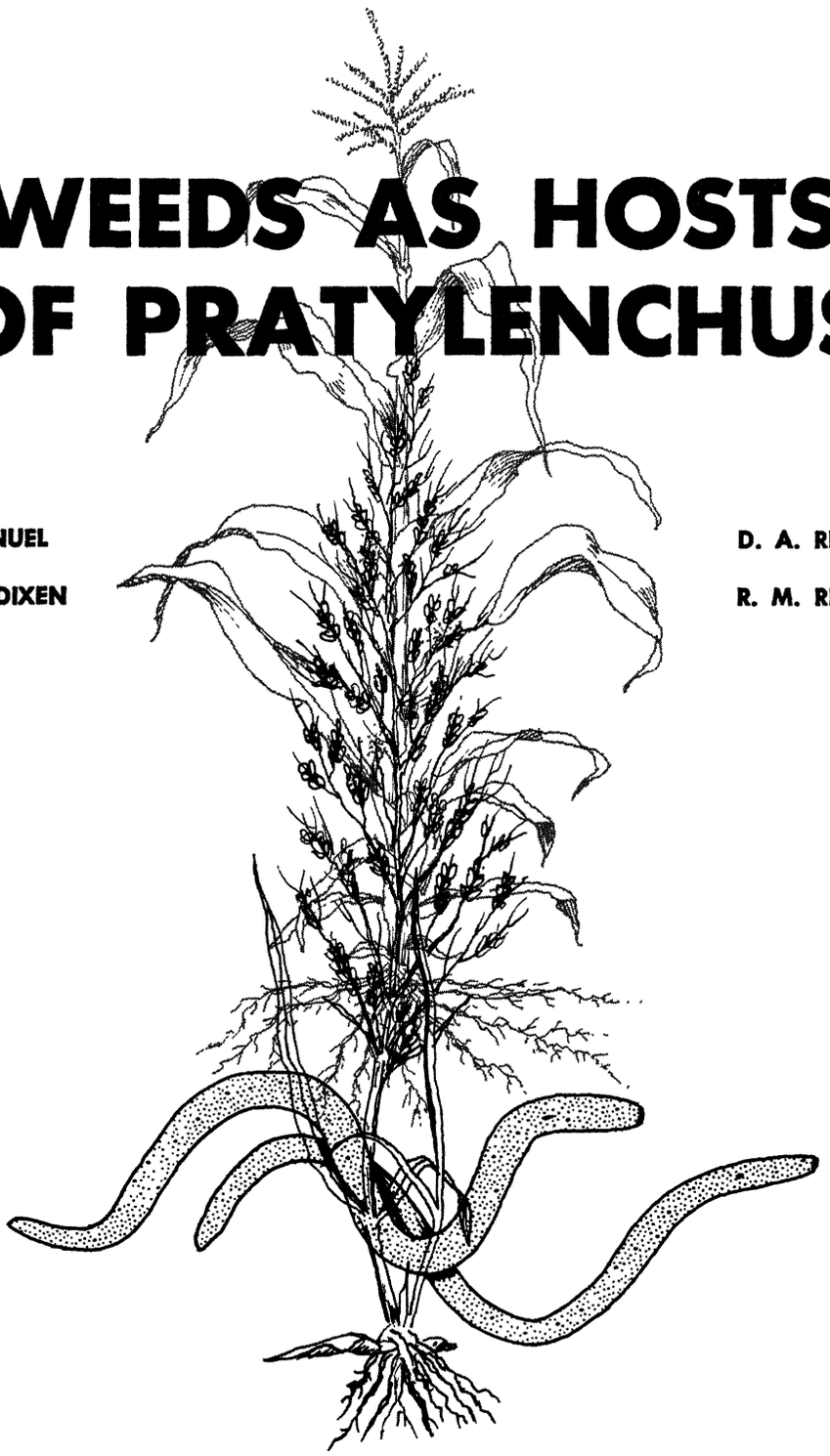
WEEDS AS HOSTS OF PRATYLENCHUS



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CONTENTS

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WEEDS AS HOSTS OF PRATYLENCHUS

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Introduction

Weeds are an integral part of the ecosystem. Their effects, most of which are adverse to other forms of higher plant life, impinge on many apsects of man's own activites and environment. Among other things, they restrict land and water utilization, they exert profound influence upon the health not only of man but also of his domestic animals, and they are a significant negative factor in crop production.

Weeds restrict crop production by competing directly with crop plants for the essentials of growth such as light, mineral nutrients, water, and carbon dioxide. Further, they lower profitability of crop production by lowering market quality of farm products and by necessitating many farm operations such as cultivation and weed control. They also cause losses of profit arising from losses of work time and operational efficiency of farm workers and machinery by their presence. In addition, weeds also limit crop production indirectly by serving as reservoirs for organisms adversely affecting crop plants such as pathogenic microorganisms, nematodes, arthropods, and vertebrates (7,22). These organisms can build populations to high levels on weed species which provide them with food, shelter, and reproductive sites that enable them to persist in the field when the host crop plants are not present. Furthermore, the stress created by the weeds on the host plants would likely increase damage caused by a given population level of the organism.

It is then clear that: 1) it is essential to keep weed populations down to a level to reduce competition with the crop and to minimize a possible significant source of a population of other crop pests in order to raise the limit of crop production, and 2) there is a need to develop and adopt an integrated multidisciplinary approach to pest control if the fight against crop pests is to be waged more effectively and successfully. Unfortunately, the trend towards more specialization which has been taking place in both research and education detracted from rather than promoted this development.

A significant contribution in reversing this not so desirable trend was the publication of an annotated bibliography of weeds as reservoirs for organisms affecting crops (7). In that publication, weeds representing more than 25 families were listed as hosts serving as reservoirs for nematodes with crop plants as hosts. Intended as a sequel to the above, attempts have been made in this paper to assemble and consolidate the published information about weeds acting as hosts of *Pratylenchus*.

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The Nematode

Pratylenchus spp., the root lesion or meadow nematodes, are widely distributed. They are found more frequently in the warmer parts of the temperate zone than in the tropical and sub-tropical regions (18,19,40,56). The nematodes are usually found in larger numbers inside the roots or other underground parts of the host plant than in the rhizospheres. They generally cause formation of dark lesions and overall browning of the roots of the infected plants. Their feedings result in decreased root growth. Infected plants become yellow and stunted.

The genus *Pratylenchus* was established by Filipjev in 1936. The genus consists of the monodelphic Tylenchidae with strongly cuticularized head. The lip region bears two to four annules with lip edges rounded or acute. The organism is generally characterized by an anteriorly tapering body with coarsely ringed cuticle, and a vigorous spear and a Tylenchoid esophagus. The tail is obtuse.

Range of Host Crops

Pratylenchus parasitizes a wide range of host crops from small herbaceous vegetables to large woody trees. They seem to have host preferences in that plants infected by a given species of the genus may not be equally suitable as a host of another. However, a single host plant may be parasitized by two or more species (39).

Endo (19) reported that *Pratylenchus* infested tobacco, corn, cotton, and peanut. *P. vulnus,* which parasitizes various trees and vines in California, has also been observed to infest boxwood and other ornamentals in Oregon (31). *P. penetrans,* which occurs widely in Oregon, has been observed in root systems of various bulbs and nursery plants. This species commonly infests corn in the North Central states. Rye and wheat are also good hosts of the nematode, but sudangrass, sudex, oats, and buckwheat are less susceptible hosts (16). Edwards and Wehunt (17) reported that *P. coffeae* attacked important crops such as corn, tea, banana, plantain, cacao, tomato, and cabbage, in addition to coffee. Vast areas planted to abaca *(Musa textiles)* in Panama, Costa Rica, Honduras, and Guatemala were also found highly infested with the nematode.

Crop Losses Due to Pratylenchus Infestation

Pratylenchus spp. caused significant losses in yield of major crops such as corn, wheat, soybean, potato, sugar cane, rubber, coffee, and tea, as well as some important vegetable and forage crops. Losses caused by this nematode normally range from 5 to 10% but can exceed 50% (11). In corn, a reduction in yield of 26% was reported (44). Reduction in yield of vegetable crops ranges from 21 to 43% (47). Seedling growth of red clover was reduced by 64% (11). With soybean under greenhouse conditions, a reduction of 25% was noted (21).

The above mentioned losses can pose alarming concern in the agricultural sectors. Loof (38) reported that the distribution of this genus of nematode is zonal. Most of them are temperate species; a few others are tropical. A species found in a given zone will occur throughout that zone. Because of its wide host range, it can be damaging not only to one but to several crops in the area.

Interaction of Pratylenchus with Other Organisms

Root lesion nematodes aid fungal infection and growth. Their feedings on the root act as wounding agents modifying the host tissue, which then becomes more suitable for invasion by other organisms.

P. penetrans was found to increase severity of *Verticillium* wilt of eggplant, tomato, pepper, strawberry, and peppermint (1,8,41,43,46). Faulkner and Skotland (20) reported that *P. minyus* increased the incidence and severity of Verticillium wilt of peppermint. Under greenhouse conditions, they found that the presence of the nematode reduced the incubation period for *Verticillium dahliae* and increased plant disease. They attributed this effect to the action of the nematode in providing a readily available invasion site for the fungus and the possible liberation of the plant materials through the wounds produced by the nematode, which enhanced germination of the sclerotia of the fungus or attracted the fungal hyphae to the damaged part. *P. minyus* was also reported to increase severity of *Rhizoctonia* root rot of winter wheat (6). *P. scribneri* and *Fusarium moniliforme* caused greater reduction of corn fresh weight when both organisms were present than either organism alone (46). *P. penetrans* and *Trichoderma viride* caused more reduction in shoot and root growth both in alfalfa and celery than in cabbage and cauliflower.

Reasons for the Interest in Weed Hosts

It is generally known that like other agricultural pests, the host range of nematodes is not confined to crop plants. Weeds constitute their greatest alternative hosts. Nematodes can remain in the field between growing seasons or for several seasons although the crops they affect are not present.

Edwards and Wehunt (17) pointed out that information on the host range of nematodes is essential in surveying prospective land for crop production. Reporting the result of their study on *P. coffeae*, they listed more than 155 plant species established as host plants for the nematode. Of this number, 41.9% were weeds belonging to 21 families. The remaining 58% consisted of agricultural crops and forest trees. Townshend and Davidson (54) reported that *P. penetrans* was found in 55 weed and 7 cultivated plant species belonging to 52 genera in 23 families, 63% of which belonged to the families Compositae and Cruciferae. The host plants varied from annuals to perennials. Perennial weeds with soft roots were noted to be the best hosts for the nematode.

Ayoub (4) found *P. zeae* in association with the roots of *Cynodon dactylon*, *Tribulus terrestris*, and *Echinochloa crusgalli* collected from a nematode-infested corn field. Certain cover crops and weeds such as *Amaranthus* sp. and *Digitaria* sp. serve as hosts for *P. penetrans* and are believed to maintain a population of the nematode (42).

Hogger and Bird (28) found *P. brachyurus* to be hosted by a number of different weed species in cotton and soybean fields. The nematode was found to be in association with the weeds before and during the growing season. The parasite was found in the roots and in the rhizosphere of *Cassia occidentalis* and *Sorghum halepense*. Egunjobi (18) made similar observations on maize. He found that significantly higher populations of nematodes occurred in the rhizosphere of maize than of the weeds. Further, he observed that the nematode population around the maize roots increased while those around the roots of weeds remained unchanged. He interpreted this to mean that weeds can sustain the parasite at a low level. More significant is the potential of these weeds serving as reservoirs, in the absence of a crop host, for nematodes which later rapidly infest subsequently planted crop hosts.

Efforts to control nematodes depend upon such practices as crop rotation, use of resistant varieties, and soil fumigation. Soil fumigation is effective but very expensive. The use of resistant varieties is generally employed for controlling nematodes. However, there is extremely limited resistance to root lesion nematode found among crop plants.

Resistance to root knot and cyst nematodes is often dependent on a hypersensitive reaction of the plant to nematode invasion. The root tissues around the feeding area die, cutting off the food supply and starving the nematodes. Unfortunately, the roots of resistant plants are destroyed by this reaction which greatly reduces the number of roots when nematode populations are high. In such case, weeds present will serve as hosts if not controlled.

Growers generally control nematodes by fallowing and crop rotation, using crops not susceptible to the nematode. However, these methods may be of limited value for the control of lesion nematodes because of the wide host range of the organism. If such practices are used, the field must be free of weeds that serve as hosts for the pest (12).

Evaluating the Literature

Most of the information gathered is from review articles. These reviews are often limited in information and have been taken from distribution lists accumulated through the years. The reviews very seldom provide information on population and other pertinent information reported in the original sources.

Care must be taken in interpreting the host range reported in literature. Hosts determined in greenhouse studies with individual potted plants are not always indicative of what actually occurs in the field. Plants are usually grown alone and the nematodes are added to the soil. The nematodes, therefore, have to feed on the existing plant or die of starvation. Field studies are usually better indicators of the host suitability, but some important points have to be stressed. With a richer mix of the plant species in the field, the crop and weeds together, the species upon which the organism is feeding is not known. The technique of sampling the plant and the soil should be an important consideration. The presence of the nematode in the soil sample may not necessarily indicate that the weed present in the same soil is the host of the organism. The capacity of the nematode to reproduce on the weed may be a better criterion to use in determining its actual host.

The criteria for a good plant host for the nematodes vary from study to study. Comparison can sometimes be made if the populations of the nematodes on the plant or in the rhizosphere are supplied. Upchurch *et al.* (55) provided figures for population increases over a period of 2 years. Caveness (10) rated host plants as excellent if populations increased 10,000 times, good if populations increased 1,000 times, moderate if populations increased 100 times, and poor if there was no increase or only a slight increase. Endo (19) similarly rated his plants. Miller and Ahrens (42) provided population counts but did not attempt to classify the plants in order of preference to the nematodes. Young *et al.* (57) categorized hosts as being infested either heavy or light but did not define the meaning of these terms.

Other workers did not use population counts to determine the plant's ability to be a host. Edwards and Wehunt (17) considered a plant as a host if all stages of the nematodes were present in the cortical tissues of the roots at the time of examination. Jensen (30) considered a plant as a host if the nematode could penetrate, develop, and reproduce in the plant. Townshend and Davidson (54) did not give population counts but reported whether lesions were present or not, and characterized the appearance of the lesion. Anonymous (2) listed hosts as "associated with plant

injury--occasionally or frequently" and as "found but not associated with injury-occasionally or frequently."

Using the Tables

A summary of the information gathered is presented in a series of tables. Nine species of the genus Pratylenchus are included. The weed hosts are listed by their scientific names and classified as to plant families and life cycles. Whenever possible the source at which the nematodes were observed is indicated.

Classification as to life cycle of the host plant is listed as: A = Annual, WA = Winter Annual, B = Biennial, and P = Perennial. The citation of the reported host is listed under one or more of three columns--the nematodes were reported either to be in the plant's roots, in the plant's rhizosphere, or not specified as to where they were observed. Each citation is listed by a number (reference) and a letter (source) that tells under what conditions the host was determined. The designations are: G = Greenhouse, F = Field, and V = Review. Greenhouse designation involved the growing of plants either in pots or in tanks and inoculated with the nematodes. The field involved collection of plants and soil samples from the infested area. Review implies that the information was obtained from accumulated literature reported by earlier workers. Generally no mention was made of the source where the organism was observed.

TABLE 1.--Weed Hosts of *Pratylenchus brachyurus*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Amaranthaceae	*Amaranthus hybridus*	A	--	--	36F
	Amaranthus spinosus	A	28F	--	--
	Celosia argentea	A	--	--	10G
Bignoniaceae	*Campsis radicans*	P	28F	--	--
Campanulaceae	*Specularia perfoliata*	A	28F	--	--
Compositae	*Ambrosia artemisiifolia*	A	28F	--	--
	Ageratum conyzoides	A	18F	18F	--
	Indigofera hirsuta	--	18F	18F	--
	Spigal anthelmia	--	18F	18F	--
	Sida spinosa	A	28F	--	--
	Tridax procumbens	P	18F	18F	--
	Xanthium pennsylvanicum	A	28F, 52F	52F	--
Cyperaceae	*Cyperus* sp.	P	28F	--	--
Ericaceae	*Vaccinium* sp.	P	--	--	51V
Euphorbiaceae	*Croton capitatus*	A	28F	--	--
Gramineae	*Chloris guyana*	--	--	--	10G
	Cynodon dactylon	P	28F	--	51V

TABLE 1 (continued).--Weed Hosts of *Pratylenchus brachyurus*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Gramineae (continued)	*Digitaria sanguinalis*	A	28F	--	--
	Eleusine africana	--	--	--	36F
	Paspalum dilatatum	P	--	--	10G
	Pennisetum clandestinium	P	--	--	10G
	Sorghum halepense	P	28F	28F	--
Geraniaceae	*Geranium carolinianum*	A	28F	28F	--
Labiatae	*Lamium amplexicaule*	B/WA	28F	--	--
Leguminosae	*Cassia obtusifolia*	A	28F	--	--
	Cassia occidentalis	A	28F	28F	--
	Lepidium virginicum	A/WA	28F	--	--
	Talinum triangulare	P	18F	18F	--
	Vicia angustifolia	A/WA	28F	--	--
Polygonaceae	*Rumex esculentus*	--	--	--	51V
Rubiaceae	*Richardia scabra*	A	--	--	51V
Scrophulariaceae	*Linaria canadensis*	A	--	--	51V
Solanaceae	*Physalis subglabrata*	A/P	--	--	51V

TABLE 2.--Weed Hosts of *Pratylenchus coffeae*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Acanthaceae	*Justica simplex*	--	17G	--	--
Amaranthaceae	*Amaranthus lividus*	A	17G	--	--
	Alternanthera brasiliana	P	17G	--	--
	Alternanthera sessilis	A	17G	--	--
Caryophyllaceae	*Spergula arvensis*	A	17G	--	--
Compositae	*Ageratum mexicanum*	A	17G	--	--
	Aster sp.	B	17G	--	--
	Bellis sp.	A/P	--	--	51V
	Crassocephalum crepidioides	--	17G	--	--
	Eupatorium triplinerve	P	17G	--	--
	Hypochoeris radicata	P	17G	--	--
	Sonchus oleraceus	A	17G	--	--
	Tagetes sp.	A	17G	--	--
	Vernonia cinerea	A	17G	--	--
Cruciferae	*Coronopus didymus*	A	17G	--	--
Cyperaceae	*Cyperus rotundus*	P	17G	--	--
Euphorbiaceae	*Euphorbia geniculata*	A	17G	--	--

TABLE 2 (Continued).--Weed Hosts of *Pratylenchus coffeae*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Gramineae	*Bromus inioloides*	--	17G	--	--
	Cynodon dactylon	P	17G	--	--
	Dendrocalamus asper	--	17G	--	--
	Digitaria adscendens	A	17G	--	--
	Eleusine coracana	--	17G	--	--
	Gigantochloa apus	--	17G	--	--
	Lolium rigidum	A	17G	--	--
	Paspalum conjugatum	P	17G	--	--
	Pollinia ciliata	--	17G	--	--
	Tripsacum laxum	--	17G	--	--
Labiatae	*Coleus scutellarioides*	--	17G	--	--
	Leucas aspera	--	17G	--	--
	Ocimum sanctum	--	17G	--	--
	Orthosiphon grandiflorum	--	17G	--	--
	Pogostemon pachouly	--	17G	--	--
Leguminosae	*Calopgonium mucunoides*	--	17G	--	--
	Cassia laevigata	--	17G	--	--

TABLE 2 (Continued).--Weed Hosts of *Pratylenchus coffeae*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Leguminosae (continued)	*Cassia mimosoides*	--	17G	--	--
	Cassia obtusifolia	A	17G	--	--
	Crotolaria incana	A	17G	--	--
	Crotolaria juncea	A	17G	--	--
	Crotolaria striata	A	17G	--	--
	Desmodium axillare	P	17G	--	--
	Desmodium uncinatum	P	17G	--	--
	Dolichos lablab	A	17G	--	--
	Mimosa pudica	P	17G	--	--
	Shuteria vestita	--	17G	--	--
Liliaceae	*Convallaria majalis*	P	--	--	51V
Oxalidaceae	*Oxalis acetosella*	P	17G	--	--
	Oxalis sp.	P	17G	--	--
Piperaceae	*Piper betle*	--	17G	--	--
Polygonaceae	*Rumex acetosella*	P	17G	--	14F
Portulacaceae	*Portulaca oleracea*	A	17G	--	--
Rosaceae	*Rubus occidentalis*	P	--	--	51V

TABLE 2 (Continued).--Weed Hosts of *Pratylenchus coffeae*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Rubiaceae	*Barreria latifolia*	--	17G	--	--
	Geophilia repens	--	17G	--	--
Scrophulariaceae	*Antirrhinum majus*	A	17G	--	--
Solanaceae	*Solanum nigrum*	A	17G	--	--
Umbelliferae	*Pastinaca sativa*	B	--	--	51V

TABLE 3.--Weed Hosts of *Pratylenchus hexincisus*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Gramineae	*Andropogon ischaemum*	P	2F	--	--
	Andropogon scoparium	P	2F	--	--
	Cynodon dactylon	P	2F	--	--
	Digitaria sp.	A	2F	--	--
	Elymus sp.	A	2F	--	--
	Panicum fasciculatum	A	2F	--	--
	Sorghum halepense	P	2F	--	--

TABLE 4.--Weed Hosts of *Pratylenchus neglectus*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Amaranthaceae	*Amaranthus* spp.	A	--	--	51V
Cactaceae	*Opuntia* sp.	P	--	--	51V
Chenopodiaceae	*Atriplex* sp.	B	--	--	51V
	Chenopodium sp.	A	--	--	51V
	Salsola kali	A	--	--	51V
Compositae	*Bellis* spp.	B	--	--	51V
	Taraxacum spp.	P	--	--	51V
Convolvulaceae	*Dichondra* spp.	--	--	--	51V
Cruciferae	*Camellia* spp.	--	--	--	51V
Cyperaceae	*Scirpus acutus*	P	--	--	51V
Gramineae	*Cynodon dactylon*	P	--	--	51V
	Sorghum halepense	P	--	--	51V
Labiatae	*Salvia apiana*	--	--	--	51V
	Salvia mellifera	--	--	--	51V

TABLE 4 (continued).--Weed Hosts of *Pratylenchus neglectus*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Leguminosae	*Astragalus* spp.	P	--	--	51V
	Caesalpinia gilliesii	--	--	--	51V
Polygonaceae	*Rumex* spp.	P	--	--	51V
Solanaceae	*Nicotiana glauca*	A	--	--	51V
	Solanum nigrum	A	--	--	51V
Zygophyllaceae	*Larrea* sp.	--	--	--	51V

TABLE 5.--Weed Hosts of *Pratylenchus penetrans*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Amaranthaceae	*Amaranthus retroflexus*	A	54F	42F	51V
Asclepiadaceae	*Asclepias syriaca*	P	54F	--	--
Caryophyllaceae	*Arenaria serpyllifolia*	A	54F	--	--
	Cerastium vulgatum	P	54F	--	--
	Stellaria media	A/WA	54F	--	--
Chenopodiaceae	*Chenopodium album*	A	54F	--	56F
	Atriplex sp.	A/P	--	--	15V
Compositae	*Achillea* sp.	P	--	--	51V
	Ambrosia artemisiifolia	A	54F	--	--
	Anthemis cotula	A/WA	54F	--	--
	Arctium minus	B	54F	--	--
	Bellis sp.	P	--	--	51V
	Chrysanthemum leucanthemum	P	54F	--	--
	Cichorium intybus	P	54F	--	--
	Cirsium arvense	P	54F	--	--
	Emilia sonchifolia	A	--	--	56F
	Erigeron annuus	A/WA	54F	--	--

TABLE 5 (Continued).--Weed Hosts of *Pratylenchus penetrans*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Compositae (continued)	*Erigeron canadensis*	A	54F	--	--
	Erigeron strigosus	A	54F	--	--
	Gnaphalium uliginosum	A	54F	--	--
	Hieracium pratense	P	54F	--	--
	Lactuca scariola	A/B	54F	--	--
	Matricaria matricarioides	A	54F	--	--
	Onopordum acanthium	B	54F	--	--
	Senecio vulgaris	A	54F	--	--
	Solidago spp.	P	54F	--	--
	Solidago altissima	P	--	--	15V
	Solidago edisoniana	P	--	--	15V
	Solidago elliottii	P	--	--	15V
	Solidago fistulosa	P	--	--	15V
	Solidago leavenworthii	P	--	--	15V
	Solidago nashii	P	--	--	15V
	Solidago sempervirens	P	--	--	15V
	Solidago serotina	P	--	--	15V

TABLE 5 (Continued).--Weed Hosts of *Pratylenchus penetrans*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Compositae (continued)	*Sonchus arvensis*	P	54F	--	--
	Sonchus oleraceus	A	54F	--	--
	Taraxacum officinale	P	54F	42F	51V
	Xanthium pennsylvanicum	A	54F	52F	--
Convolvulaceae	*Convolvulus arvensis*	P	54F	--	--
Cruciferae	*Barbarea vulgaris*	P	54F	--	--
	Barbarea kaber	A/WA	54F	--	--
	Capsella bursa-pastoris	A	54F	--	--
	Erysimum cherianthoides	B/P	54F	--	--
	Lepidium campestre	A/WA	54F	--	--
	Rorippa sylvestris	P	54F	--	--
	Sisymbrium altissimum	A/WA	54F	--	--
	Sisymbrium loeselii	A/WA	54F	--	--
	Thalaspi arvense	A/WA	54F	--	--
Equisetaceae	*Equisetum arvense*	P	54F	--	--
Gramineae	*Alopecurus pratensis*	A/B	30G	--	--
	Arrhenatherum elatius	A/P	30G	--	--

TABLE 5 (Continued).--Weed Hosts of *Pratylenchus penetrans*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Gramineae (continued)	*Bromus inermis*	A	30G	--	15V
	Cynodon dactylon	P	--	--	30V
	Digitaria ischaemum	A	--	42F	15V
	Digitaria sanguinalis	A	--	42F	15V
	Eragrostis cilianensis	A	--	42F	--
	Panicum capillare	A	--	42F	--
	Setaria viridis	A	--	--	15V
Guttiferae	*Hypericum punctatum*	P	54F	--	--
Labiatae	*Lamium amplexicaule*	A	54F	--	--
	Lamium hybridium	A	54A	--	--
Liliaceae	*Convallaria majalis*	P	33F	--	30V
Malvaceae	*Malva neglecta*	B	54F	--	--
Onagraceae	*Epilobium* sp.	A/P	54F	--	--
Plantaginaceae	*Plantago major*	P/A	54F	--	--
Polygonaceae	*Mollugo verticillata*	A	42F	--	--
	Polygonum aviculare	A	54F	--	--
	Polygonum convolvulus	A	54F	--	--
	Rumex crispus	P	54F, 37G	--	--

TABLE 5 (Continued).--Weed Hosts of *Pratylenchus penetrans*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Ranunculaceae	*Delphinium* sp.	P	--	15V	
	Ranunculus abortinus	P	54F	--	--
Rosaceae	*Potentilla norvegica*	B	54F	--	--
Scrophulariaceae	*Veronica arvensis*	A	54F	--	--
Solanaceae	*Solanum dulcamara*	P	54F	--	--
	Solanum nigrum	P	54F	--	--
Umbelliferae	*Daucus carota*	A/B	54F	--	15V

TABLE 6.--Weed Hosts of *Pratylenchus scribneri*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Amaranthaceae	*Amaranthus* sp.	A	--	--	51V
Chenopodiaceae	*Chenopodium album* L.	A	--	--	51V

TABLE 7.--Weed Hosts of *Pratylenchus thornei*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Convolvulaceae	*Dichondra* sp.	P	--	--	51V
Compositae	*Taraxacum* sp.	P	--	--	51V
Gramineae	*Agrostis* spp.	P	--	--	51V
	Cynodon dactylon	P	--	--	51V
	Paspalum dilatatum	P	--	--	51V
	Pennisetum clandestinum	P	--	--	51V
	Poa annua	A	--	--	51V
	Sorghum halepense	P	--	--	51V

TABLE 8.--Weed Hosts of *Pratylenchus vulnus*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Leguminosae	*Cytisus scoparius*	P	30G	--	--
Liliaceae	*Convallaria majalis*	P	--	--	51V
Polygonaceae	*Polygonum aviculare*	A	--	--	51V
Rosaceae	*Rosa californica*	P	--	--	51V

TABLE 9.--Weed Hosts of *Pratylenchus zeae*.

Plant Family	Weed Species	Life Cycle	Reference and Source		
			Root	Rhizosphere	Not Specified
Amaranthaceae	*Amaranthus retroflexus*	A	--	55F	--
Chenopodiaceae	*Chenopodium album*	A	--	55F	--
Compositae	*Ambrosia artemisiifolia*	A	--	55F	--
Gramineae	*Andropogon virginicus*	P	25G	--	--
	Cynodon dactylon	P	4F, 25G	--	--
	Dactyloctenium aegyptium	A	25G	--	--
	Digitaria sanguinalis	A	19G, 34F	19G, 34F, 55F	34F
	Echinochloa crusgalli	A	34F, 4F	34F	--
	Eleusine indica	A	55F	55F	--
	Sorghum halepense	P	--	--	19G, 34F
	Sporobolus poiretii	P	--	--	34F
Leguminosae	*Crotolaria virginicus*	A	24G, 40F	--	--
Malvaceae	*Sida rhombifolia*	A	40F	--	--
Rubiaceae	*Diodea teres*	A	25G	--	--
Zygophyllaceae	*Tribulus terrestris*	A	4F	--	--

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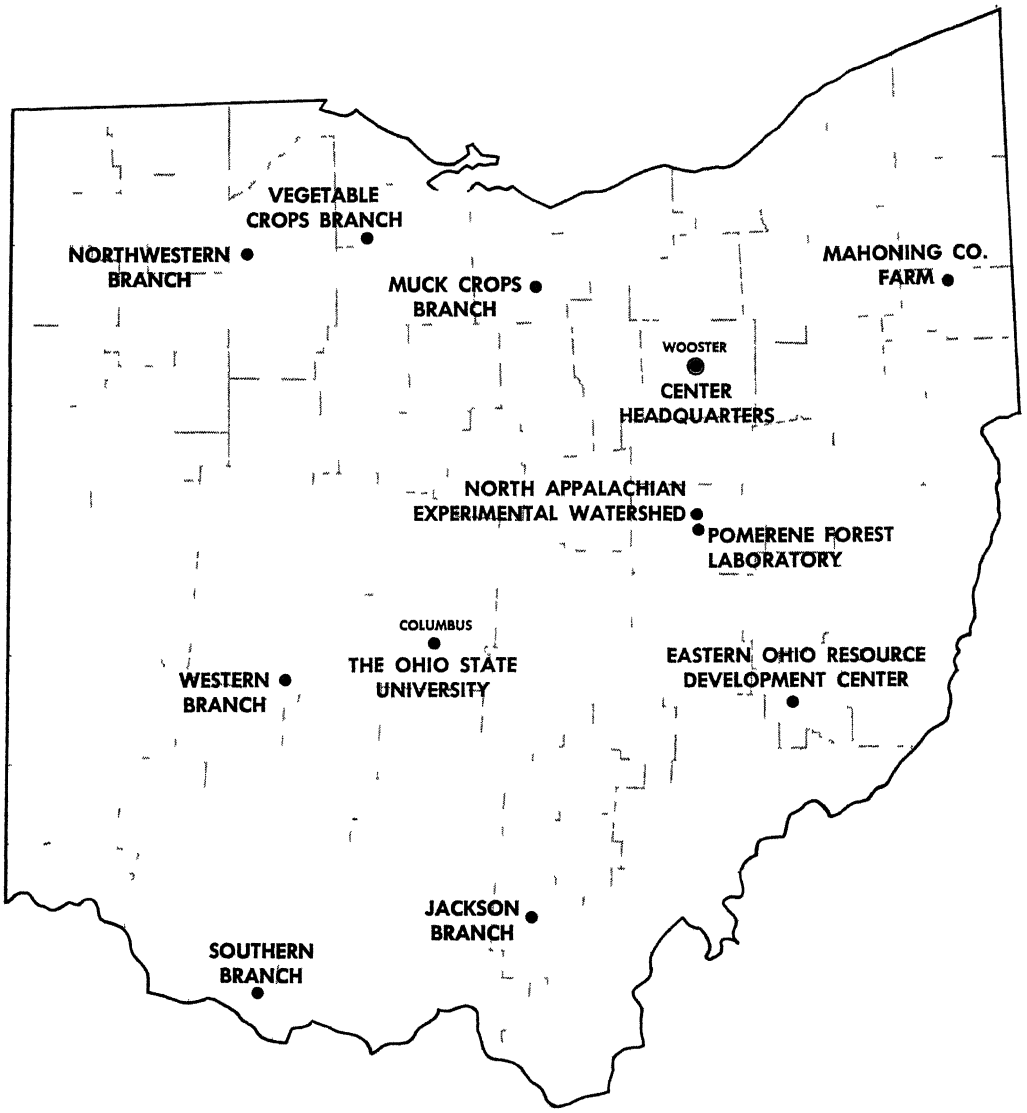

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